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Abstract

THE PERIODIC SYSTEM OF ATOMIC NUCLEI AND THE POSSIBILITY OF NEW ISOTOPE APPLICATION IN SCIENCE AND TECHNOLOGY

I.P.Selinov

I. The periodic system of atomic nuclei.

The rational systematization of nuclids reflects the regularities of atom nucleus structure, systemizes the isotope properties and facilitates the new isotope search.

The determination of a number of periodical regularities in masses, mass numbers, abundance and other properties of isotopes makes it possible plotting of atomic nucleus periodic system(on the bases of shell model of nucleus).

The paper desribes the gelionic type of building 2β-stable nuclids and the analogic isotope concept.

The proposed atomic nuclei system is described. The principal identity of different forms of the nuclid system which depicture the same regularities in atomic nuclei plotting is shown.

II. The possibility of new isotope discovery and application in science and technology.

Stable isotope mass numbers are predicted in the old variant of the authors's periodic system of isotopes.

Radioactive nuclids are systemized and mass numbers of -stable isotopes of transuranium elements are predicted . The regularities in half-lives comprise the basis of search for new isotopes

The possibility of discovery of new isotopes useful as radiotracers (Ti^{52} etc) and in geological age determination is shown. The possibility of use of some new fissible isotopes as compact neutron sources particularly for activation analysis is described.

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The probability of symmetric fission of ekapolonium -stable isotopes (Z=106) and the possibility of existence of neutronless nuclid sources of nuclear energy very useful for practical purposes are p reported.

The anomalies in abunances of lantanide isotopes are explained by cosmic occurence of these isotopes due to the fission of superheavy nuclids with atomic numbers Z=106, 116 and with magic numbers of neutrons. The increase of half-lives of a number isotopes of these translawrencium elements and the possibilities of their artificial production are proposed.

III. The organization of regular and quick publication of international reference tables of isotopes and nuclear constants is described as purposeful.